OSU Transportation Choices: What Drives Us?

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Problem Statement

This report is based on the 2014 transportation choices survey data by OSU's Capital Planning and Development group to explore current trends in transportation choices among university employees and students. The survey revealed that for both groups, *convenience, saving time, and cost* – in that order – are the top incentives in choosing different modes of transportation. The report examines choices among employees, choices among students, and analyzes how the major modes of travel compare in terms of convenience, saving time, and cost.

I. Employee Transportation Choices

Background

The most common primary travel modes to OSU campus are driving alone (single occupant vehicle – SOV), biking, walking, car/van pooling, and public transit systems. This study seeks to understand the motivations of travel mode choice including but not limited to geographic areas/distance, ranked preferences, availability of modes, age groups, etc. Data visualization and exploratory results are provided to reveal general patterns. Policy recommendations are provided based on those results.

Findings

The percentage of different travel mode uses among respondents sampled in each zone area is shown in Figure 1. While this visualization does not reveal the true population density in each zone, the rate of SOV use generally increases along with car/vanpooling as distance from campus increases, while the rates of biking/walking generally decrease as distance from campus increases. Public transportation use depends on the specific zone and can be analyzed using GIS based on actual availability of bus stops in the areas.

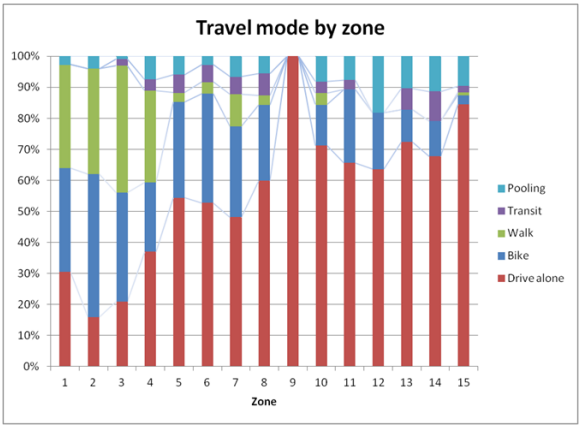

Figure 1: Travel mode by zone in percentage of users

Figure 2 preserves the actual numbers of participants in each zone. Employees from zone 15 are the largest group; they live outside of Corvallis and hence are long distance commuters, which results in high rates of SOV use. Of female employees traveling to campus, 67% drive alone to work, for males this percentage is 53%. Across all age groups, over half of employees drive alone, with the highest SOV percentages being in the age ranges 46-55 (64%), and 56-65 (68%). The ratios of single drivers in classified and unclassified employee groups are 66% and 61%, respectively.

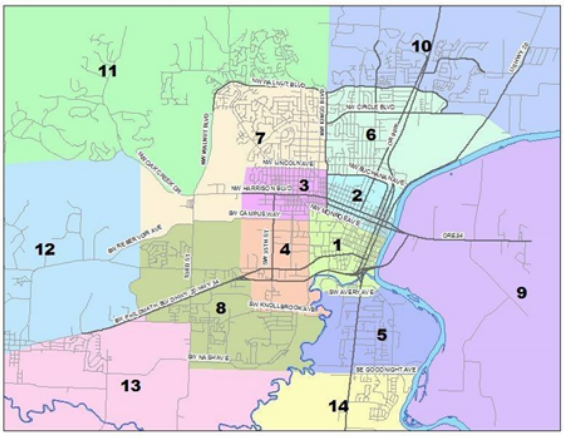

Figure 2: Corvallis zone map

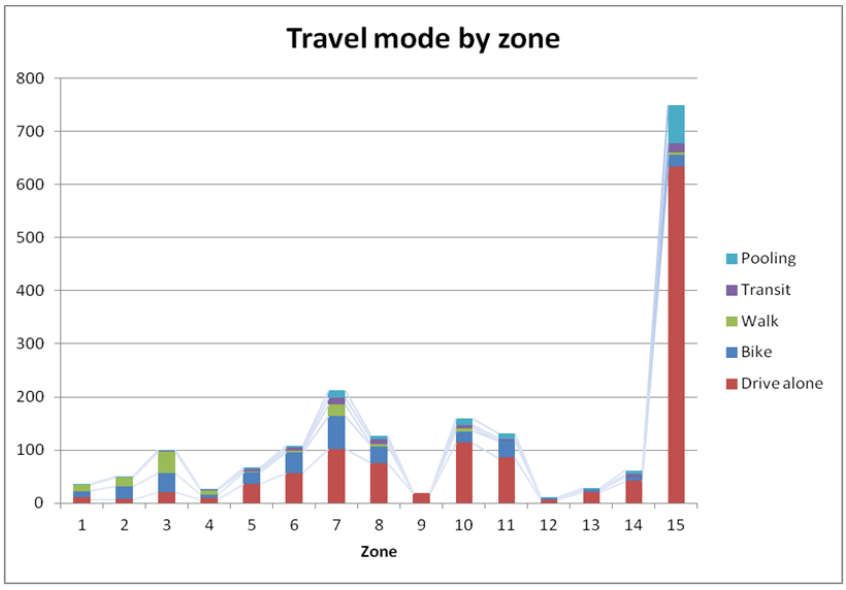

Figure 3: Travel mode by zone in actual numbers of users

SOV: The top listed reasons for using this mode of transportation include: flexibility/ convenience, especially for those who need to run errands, change job locations, or work late (53% of drivers total); time saving (50%); scheduling convenience (43%); family and other obligations (41%); they have no other choice (21%); and affordability (13%). It is worth mentioning that most drivers also provide in the "Others" optional response some common reasons for their choice of commuting mode, such as safety (for example, biking is dangerous during bad weather, at dark hours, or on highways without ample bike lanes such as Hwy 20), and distance (for those who live far away in areas without nearby bus stops, or the Corvallis - Philomath connect buses are not scheduled after 5:00 pm). Many employees also need to dress professionally and biking is not supportive of this attire.

Biking: Within reasonable distance, employees favor this mode due to its health benefits (88%), pro-environmental awareness (80%), convenience (64%), time efficiency (51%), affordability (50%), and the perception that it is the most relaxing travel mode (27%). With the flexibility of biking, users of this mode avoid driving mostly because parking on campus is expensive and inconvenient. They also avoid taking the bus due to inconvenience and longer travel times.

Walking: This group ranks the health benefits of walking as the top reason for choosing this mode (80%), followed by pro-environmental awareness (65%), convenience (54%), affordability (43%), time efficiency (28%), and scheduling (10%). Preference for walking over biking is explained by the concern over or past experience with bike theft.

Car/van-pooling: Among car/vanpoolers, convenience (47% of car/vanpoolers), short arrival time (37%), family obligations (37%), being the drivers themselves (23%), affordability (28%), and scheduling (26%) are the priorities,

Public transportation: Users of public transit system value affordability (68% of public transit system users), environmental friendliness (56%), convenience (40%), and relaxation (35%) of this mode.

Policy Recommendations

In order to encourage alternative transportation choices to single occupant vehicles, several policy recommendations are drawn based on the survey results. Those improvements combined can also facilitate multi-mode traveling (e.g. bike – bus – bike, walk – bus, etc.).

1) Biking: accessible, secured, sheltered bike storage to prevent theft; more bike racks on buses and on campus

2) Walking: safe alternative routes for walking/biking through construction zones.

3) Public transit: more frequent shuttle/bus (details provided in further analysis); more Beaver shuttles at rush hours; more bus stops in parking lots; bus runs after 5 p.m.

II. Student Transportation Choices

Background

This section examines five categories of transportation: biking, walking, driving, transit, and carpooling/vanpooling. The transit category refers to riding the Corvallis Transit System. The driving category refers to driving alone (single occupancy vehicle, SOV). This section analyses OSU students who live in Corvallis, but not on campus. Data on choice of transportation mode was not available for students who live on campus.

Findings

The survey shows that driving alone is the most frequently selected mode of transportation among OSU students. The results (Table 1) show that a zone of leaving is the main factor that influences transportation choice. We use three zones to delineate gradually increasing distance from campus: "minzone", "medzone" and "maxzone." The findings offer illuminating comparisons using multiple competing factors in students' lives.

Living in min zone compared to max zone decreases the probability of choosing transit, carpool or driving while it increases the probability of choosing walking and biking. Living in med zone also decreases the probability of driving while it increases the probability of choosing other modes of transportation.

↑ Being an undergraduate student, female, and living in min and med zones compared to being a graduate student, male, and living in max zone *increases* the probability of choosing **Walking** as a primary mode of transportation.

↓ Being at age 29-35 compared to being at age 16-23 *decreases* the probability of choosing **Walking** as a primary mode of transportation.

↑ Being at age 23-35, having an internship/a job on campus, living in min and med zones compared to being at age 16-25, not having an internship/a job on campus, living in max zone *increases* the probability of choosing **Biking** as a primary mode of transportation.

↓ Being an undergraduate student and female compared to being a graduate student and male *decreases* the probability of choosing **Biking** as a primary mode of transportation.

↑ Being an undergraduate, other type of student, full-time student, female, at age 23-45, working 5 days and less, being on campus less and more than 5 days compared to being a graduate student, part-time student, male, at age 16-23, working more

than 5 days, and being on campus 5 days *increases* the probability of choosing **Driving** as a primary mode of transportation.

Table 1. Impact of students' demographics on transportation choice

Variable	Walking	Biking	Driving	Transit	Carpool
Undergraduate	↑	↓	↑	0	0
Other	0	0	↑	↓	0
Full-time	0	0	↑	0	0
Have internship/job	0	0	↓	0	0
Internship/job on campus	0	↑	↓	↑	0
Female	↑	↓	↑	0	0
Other gender/prefer not to say	0	0	0	0	0
Age 23-28	0	↑	↑	0	0
Age 29-35	↓	↑	↑	0	0
Age 36- 45	0	0	↑	0	0
Age 46plus	0	0	0	0	0
Age prefer not say	0	0	↑	0	0
Minzone (1-4)	↑	↑	↓	↓	↓
Medzone (5-8)	↑	↑	↓	↑	0
Work less than 5 days	0	0	↑	0	0
Work five days	0	0	↑	0	0
Come to campus less than 5 days	0	0	↑	0	0
Come to campus more than 5 days	0	0	↑	0	0

Legend:
↑ - increases the probability of choosing the transportation mode compared to reference category (see details on reference categories below)
↓- decreases the probability of choosing the transportation mode compared to reference category (see details on reference categories below)
0 – has no impact on the probability of choosing the transportation mode compared to reference category (see details on reference categories below)

↓ Having an internship/a job, having an internship/a job on campus, living in min and med zones compared to not having an internship/a job, having an internship/a job off campus, living in max zone *decreases* the probability of choosing **Driving** as a primary mode of transportation.

↑ Having an internship/a job on campus, living in med zone compared not having an internship/a job, living in max zone *increases* the probability of choosing **Transit** as a primary mode of transportation.

↓ Being other type of student, living in min zone compared to being a graduate student and living in max zone *decreases* the probability of choosing **Transit** as a primary mode of transportation.

↓ Living in min zone compared to living at max zone *decreases* the probability of choosing **Carpool** as a primary mode of transportation.

Policy Recommendations

1) Develop new elements within the Corvallis Transit System to cover all zones of living with bus routes, so residents of outer areas of Corvallis can get to campus at regular intervals without using private transport.

2) Encourage biking among undergraduate students by organizing educational seminars on environmental benefits of biking, providing more parking spots and shelters for bicycles, making campus roads safer for bicycles users.

3) Plan focus groups to investigate why women prefer not to bike.

4) Promote carpools and vanpools through educational programs; organize regular carpools with a schedule and defined stops; create an online application to ease finding a carpool among OSU students.

5) Organize a "Civil War" competition between ride-sharers at OSU vs University of Oregon

6) Provide car stickers for carpooling cars to champion carpoolers to the general public; create multiple attractive parking spots reserved only for carpooling cars.

III. Major modes of travel: Overall choices and incentives

Background

With convenience, time-savings, and cost as the three chief motivators in transportation choice, this section examines how major modes of transportation rank with respect to these motivators.

Findings

Transportation choices are strongly related to distance. Using the transportation choices in Google Maps, bike and car are the most convenient options and quickest depending on distance. Time of day affects the time of travel when getting Google results.

Destination (from Student Experience Center)	Distance (in miles)	Time (in minutes)			
		Bike	Bus	Walk	Car
Franklin Park	0.8	5	N/A	15	4
Chintimini Park	0.8	5	N/A	15	5
Majestic Theater	0.9	4	13	19	4
New Retreat	1.3	6	19	24	4
Timberhill Apartments	2.4	12	23	46	9
Hemlock	2.8	16	32	56	9
Grand Oaks	3.1	14	15	54	8
Philomath Museum	5.8	31	24	103	14
Adair Vilage	8.7	44	46	170	16
Albany	11.7	61	84	231	19

Table 2: Sample trip distances and times

Within 3 miles of the OSU campus, a bike is the fastest, if the time to walk from parking is included. Biking is also the cheapest and most convenient. Bike parking is free, and one can bike right to a destination. Biking, however, is not pleasant in rainy, cold weather and during the winter months when travel is often in the dark. Bike use drops substantially during late fall and winter.

While the car is as convenient as a bike and travels faster, all car trips require at least some walk from parking to the final destination. Those who purchase the most expensive parking permits can reduce the length of this walk.

As Table 2 shows, bus travel is slower than the other modes except for walking. Bus travel requires walking on both ends of the trip, which adds to the time and affects convenience. Walk time is included in bus travel calculations.

Walking is healthy, affordable, and good for the environment. A mile, however, is about the limit for students who make this choice, as shown in Table 3, which shows the percentage of students who choose a particular mode of transportation in relation to trip distance.

Distance (in miles)	Mode choices (by %)			
	Walk	Bike	Bus	Drive
<1.5	83	52	9	8
1.5-3.8	11	38	56	31
>3.9	6	10	35	62
Total	100	100	100	100

Table 3: Percentage of students choosing a particular mode of transportation in relation to trip distance

Other factors in selecting the mode of travel are the travel plan for the day, which might include attending a meeting or event. It might involve picking up children, groceries, or supplies. Thus, other obligations often make car trips most preferable. Convenience of bus routes and bus schedule are important and strongly affect this choice.

Taking a car to gain convenience has substantial costs. Parking closest to one's office costs S495 or $330 per year. For people making a short trip to campus, $1 and $2 per hour parking is available. Cars also require substantial capital, maintenance, and operational costs. Thus, while most convenient, cars also cost the most. Further, cars have the highest environmental costs in land for roads and parking. They cause polluting emissions, congestion, and neighborhood clutter. When one has a car and has purchased a parking permit, however, there is little financial incentive to stop driving except for congested driving or parking inconvenience. Further, under current conditions the availability of free on-street parking within the campus boundaries and off campus within convenient walking distance offers convenience and cost that out-compete on-campus parking alternatives for many.

A bus can work as a substitute for a car. CTS buses are free. However, most CTS bus routes do not extend beyond much of the walkable and certainly bikeable area. The Loop Bus is a valuable source for travel from Albany, the 99 Express from Adair Village, and the Philomath Connection from the west. The problem with buses is that their schedules and routes are not always convenient or time efficient.

Policy Recommendations

1) The convenience and quickness of a car have to be beaten by other modes of travel. Survey data show that current transit alternatives make this hard to do. However, parking increasingly makes car travel more costly and congestion makes trips time consuming.

2) Parking planning has to take into account episodic events as well as daily and seasonal travel patterns. Parking demand on any given day can be affected by weather, an athletic event on a class day, a conference scheduled in University facilities on a class day, a special speaker coming to Gill Coliseum or LaSells Stewart Center.

3) Regular experiments are likely to be better for determining how to serve parking demand. A potential goal would be to increase the availability of parking spaces for fixed-term purchase as opposed to annual permits. This brings a cost calculation into each daily parking choice.

4) The survey and fall 2014 behavior show that pricing has a significant effect on parking demand. Actual experience showed that pricing was a more significant factor than the survey would predict. A system of dynamic pricing, where parking prices fluctuated with demand, could be an effective way of allocating parking.

5) Opportunities will continue for experimenting and modifying transit and parking programs. New residence developments like The Retreat, Witham Oaks, South Corvallis Golf Course, and other large concentrations of students a mile or more from campus are highly likely to add bike, bus, and car traffic that will stress existing parking infrastructure and transit services.